

The scenario continued to exacerbate day by day. The outbreak changed into an epidemic and then pandemic very soon. Several countries have observed exponential growth in the number of new cases, and active cases. Some agencies are supporting researches on novel coronavirus like NIAID [8], CEPI, EMA, NCBI, NCM etc. The Centre for Disease Control and Prevention (CDC) [9], USA is updating the world of the current threads about the novel coronavirus and COVID-19 24x7x365. The total number of cases reported till now worldwide are reported in Table 1[11].

Table 1. Till Date Reporting [22nd May 2020]

Reported	Active	Recovered	Deaths	Critical
5,221,567	2,787,749	2,098,615	335,203	45,498

Though the epicenter of the disease was China yet other major affected countries are the United States of America, Russia, Brazil, Spain, United Kingdom, Italy, France, Germany, Turkey, Iran, India and Peru where more than 0.1 million cases have been reported till 20th May 2020 [24]. The World Health Organization pronounced COVID-19 as a worldwide pandemic on 11th March 2020 [26].

The most striking feature of the novel coronavirus is that it is spreading from one infected person to others in the incubation period and without knowledge of both the parties. Human coronaviruses typically spread from a contaminated individual to others through any of the accompanying methods in particular,

- The droplets spread by cough and sneeze.
- Close individual contact like touch or handshakes.
- Touching face, eyes, or nose after touching a virus-infected object or surface; without washing hands.

1.3 Preventions and Precautions

Some typical recommendations for preventing infection spread are

- Maintaining at least 1-meter distance with anyone.
- Covering face with an elbow while coughing or sneezing.
- Washing hands with soap regularly.
- Avoiding face, eye and nose touch.
- Avoiding less-cooked or raw meat.
- Avoiding unnecessary animal contact.
- Staying quarantine if you are unwell.
- Refrain from smoking.
- Practice physical or social distancing.
- Avoid travel or large gatherings.
- Use alcohol-based sanitizer for cleaning hands and public surfaces and objects.
- Stay home if it is not much necessary to go out.

This paper focuses on summarizing the happenings about the coronavirus and the disease spread and presents some valuable insights, combining many aspects in a single study. The remaining structure of this document is as follows: section II presents a brief literature survey, section III provides a short note on the role of technology in the epidemic, section IV shows the impact of the epidemic in diverse fields. Section V presents the current scenario while Section VI presents the conclusion.

2. Literature Survey

Li et al. [4] conducted a study in 2005 following the SARS emerged in 2002 and 2003 in China in which they reported bats to be natural reservoirs of SARS Coronaviruses. The reservoir hosts of several other zoonotic viruses like Hendra and Nipah that had appeared in past in Australia and East Asia were also bats. Gralinski and Menachery [5] were confident of tackling the return of coronavirus better because of technical advancements and significant lessons learnt from previous outbreaks. They presented their insights about the novel coronavirus and its spread in healthcare settings. They insisted that human to human transmission is a major threat from the current infection. Paules et al. [6] presented a viewpoint in their study about the trajectory of the outbreak, effective response strategy, and apt progress and execution of active countermeasures required to contain the outbreak. The genome of the novel coronavirus was described by [10]. Droston et al. [12] experimented with a random-amplification procedure using polymerase-chain-reaction after isolating the virus in cell-structure. The genetic characterization of the virus depicted that the virus was distantly related to the so-far-known coronaviruses. They concluded that SARS diseases can be caused by the novel coronavirus which was first invented in 2002-03.

Zaki et al. [13] in 2012 investigated an unknown coronavirus (HCoV-EMC); able to replicate radially in cell culture, in the saliva of a 60-year old patient who suffered from “acute pneumonia and subsequent renal failure”. The virus was found to produce cytopathogenic effects or structural changes. This virus represented a new beta coronavirus species. The nearest known family members were bat-coronaviruses; “HKU4” and “HKU5”. The authors presented the crucial clinical information, infection detachment, and molecular identifications. The results were very much similar to the Severe Acute Respiratory Syndrome (SARS) epidemic happened in 2003. Menachery et al. [14] examined the disease potential of a SARS-like virus SHC014-CoV. These experiments unlocked the potential of using meta-genomics data to envisage and contain the upcoming emerging virus eruptions due to Chinese horseshoe bat populations and the virus SHC014-CoV. An editorial published on 20th February 2020 [15] extended the understanding of the novel virus and its potential consequences.

A team of nine doctors [16] evaluated thin-section computerized tomography of real-time reverse transcription polymerase chain reaction on a set of 51 patients (25M & 26F). Fifty out of 51 patients were found to be in contact with subjects from the epidemic center. Fever and cough were the most general symptoms found in the patients. Wang et al. [17] presented serological evidence of bat SARS-related coronavirus infections in humans in the form of a letter to the editor of *Virologica Sinica*, Springer Nature. In this work, the authors performed a serological investigation on individuals living in the vicinity of bats' caves where they carry diverse SARS-CoVs. Zhou et al. [18] reported the identification and characterization of the novel coronavirus of probable bat origin. Upon a detailed investigation of full-length genome sequences of five patients from Wuhan, they found 79.6% similarity of the new virus with SARS-CoV. They also found a 96% similarity of the virus with a bat coronavirus. They also experimented with pairwise protein sequence analysis of

seven conserved non-structural proteins concluding that the SARS-CoV2 also uses the same cell entry i.e. ACE2 as receptor just like SARS-CoV. The authors submitted the sequences generated through their experiments to GISAID [10] (under accession number EPI_ISL_402124).

Gorbalenya et al. [19] answered some vital questions about SARS-CoV2 such as defining novelty and taxonomy of SARS-CoV2. This study emphasizes focusing on pathogens to understanding virus species. Beta-coronaviruses are enveloped non-segmented positive-sense RNA viruses that belong to the family of coronaviruses and are widely spread in humans and other mammals [20]. A summarized view of top publishing researches can be found in [21]. The articles found on LinkedIn and other social media platforms are also catching attention. Table 2 gives an insight into some of the trending publications related to nCov19 i.e. SARS-CoV2 and COVID19 with their key contributions.

Table 2. Some Trending Publications

Authors	Pub. Date	Contribution
Huang et al. [27]	January 24, 2020	Clinical investigations of patients suffering from novel coronavirus were reported for the first time. Patients in the Intensive Care Unit (ICU) had higher plasma levels as compared to Non-ICU patients.
Li et al. [28]	January 29, 2020	Some more detailed investigations and results related to 2019-n-CoV infected Pneumonia (NCIP) were reported.
Holshue et al. [29]	January 31, 2020	The authors reported a detailed case study of the first case of 2019-n-CoV in the United States of America.
Shen et al.[30]	March 27, 2020	Good News: Treatment details of five critically ill patients through convalescent plasma were reported by authors.
Fong et al. [31]	April 9, 2020	Use of AI in predicting the order of growth of the epidemic: A case study with application of Composite Monte Carlo algorithm enhanced by using a deep learning network with fuzzy rule training for achieving improved statistical results in terms of predictions about the potential growth of the epidemic is investigated by authors.
Gao et al. [32]	February 29, 2020	Good News: The Authors reported Chloroquine phosphate showing seeming usefulness in the cure of COVID-19.
Liu et al. [34]	March 12, 2020	The authors reported some interesting results on therapeutic agents and vaccines for COVID-19.
Pirouz et al. [35]	March 20, 2020	Another Perspective of COVID-19 through AI: Authors investigated a predictive analysis of affirmed cases through binary classification using a regression analysis scheme.

Like the growth of confirmed cases of COVID-19, the graph of research publication over coronavirus or COVID-19 also going exponential. To assemble all important publications, several publication agencies have come together. Also, they have made open access to research articles on COVID-19 and coronavirus related topics free. In this context only, The Allen Institute for Artificial Intelligence (A2I) has partnered with the National Library of Medicine (NLM), National Institute of Health (NIH), and Microsoft Inc. to compile and distribute an "Open Research

Dataset for COVID-19" known as CORD-19. The dataset is available on A2I's semantic scholar webpage [23].

3. Role of Technology in Epidemic

Technology has always played a significant role in any circumstances. In this crucial time too, Technology enabled digital tools such as telehealth, remote patient monitoring, data analytics, and even consumer-facing Artificial

Intelligence enabled robots and chatbots are contributing significantly in comprising the flare-up of COVID-19. Earlier instances of using *drones* to spread awareness about the coronavirus, its symptoms, the infection spread, and precautions were seen in Wuhan and other close areas in China. Chinese tech-giants have accelerated their efforts in health-care technology amid the novel coronavirus outbreak. Few examples consist of cloud computing-based analysis of medical images and e-doctor consultation.

Alibaba - an e-commerce giant in China and Baidu - China's most used search engine launched online clinic services and e-doctor consultation platforms for the infected people so that they need not visit doctors physically. As per Baidu, they have tackled 15 million queries so far and more than 1 million doctors have registered and are available to answer online queries. Baidu is also providing a healthcare assistance algorithm (LinerFold) to gene-testing offices, epidemic control, and research centres all around. The algorithm helps scientists to comprehend the hereditary cosmetics of the coronavirus and could assist endeavours with developing an immunization. A real-time fever check facility is being performed in Singapore hospitals by using a smartphone and a thermal sensor. Tencent - video gaming company has launched a free online health consultation service in China. XAG Robot is also deploying disinfectant-spraying robots and drones in Guangzhou, China. Another vital study has published in the context of using digital teaching-learning systems through television broadcasts in China to provide undisrupted education to millions of affected students. The study by Wang et al. [7] also mentioned the side effects of home confinement of children during the epidemic period in the form of increased stress, prolonged fear, frustration, and boredom, etc. due to non-involvement of children in outdoor activities. In this context, "Emergency Home-schooling Plan" and the "Virtual Semester" are significant exertions by the Chinese Government and Authorities to mitigate the side-effects of students' home confinement.

Healthcare automation using Artificial Intelligence (AI) and Machine Learning (ML) has emerged as a boom gaining sector in the corona crisis. Tele-Health is trending high. Tracing travel history using AI tools, using ML to track contact tracing are examples where technology is remarkably doing well to fight against coronavirus. Many such instances have come into existence in recent real-time, where AI, Machine Learning, and Big Data are being used as a shield against COVID-19. Several instances of technical developments are a morale boost during the pandemic. Disinfecting robots deployed at airports, automatic temperature sensing devices, Arogya Setu App (NIC, GoI, India) which alarms in case any coronavirus infected person is present nearby, Clara - a Chatbot for automated symptoms check facility developed by CDC, USA are examples to name a few.

4. Impact of Epidemic in diverse fields

Wuhan - the epicentre of the novel coronavirus epidemic has been in a condition of lockdown for the last two months. The major impacts of pandemics on society can be economic, social, and political. The economic damage through multiple channels in parallel is a common scenario during a pandemic. Individual behavioral change, recession, and credulity are other apparent side effects of such pandemic. Though fear played a major role in the SARS epidemic, yet author in [16] is hopeful of alleviating fear due to lessons from past epidemics and some specific anti-coronaviral therapies in development.

New lifestyles spread diseases further. Most of the epidemics spread so far like Chikungunya, Ebola, Cholera, Plague, Zika, Nipah, MERS-CoV, Lassa fever, Yellow fever, Influenza A, Monkeypox, Nodding syndrome, etc. have emerged due to one or the other of the next mentioned reasons namely; major and unstandardized changes in lifestyle, not following traditional control measures, unnatural, unnecessary and extended contact and the excessive involvement of animals in human life.

The areas of eerie impacts of the pandemic with their consequences are enlisted in Table 3.

Table 3. Areas of Impact of Pandemic and their consequences

Impact	Consequences
Behavioral	Emotional weakness, fear, distress, credulity
Trade and Economics	Economic Slowdown, Financial Crisis, Recession
Mental health	Anxiety, Sleep Disturbance (irregular sleep patterns), Stigma
Physical health	Less physical activity, longer screen timings, weight gain

5. Current State

Some key symptoms of COVID-19 are high fever (i.e. $\geq 100.4^{\circ}$ F), dry cough, sore throat, and difficulty in breathing. Any patient with these symptoms needs to be treated as per the current healthcare settings available for COVID-19. The disease spreads with contact to coronavirus infected person's droplets on daily-use things, surfaces or physically coming in contact with the infected person itself. Social distancing, isolation and staying at home are the only solution that has been found so far. Several countries have imposed emergency, lockdown and curfews as measures to contain and combat the virus spread disease COVID-19. The suspicious of the infectious disease are quarantining themselves in isolation either themselves or by government initiatives around the world. Several trials for developing a vaccine, tests, and treatments are for the containment of the virus are currently undergoing around the globe. Numerous

rigorous steps have been taken by many countries to stop the infection spread and to control the situation at the earliest. All walks of life such as education, business, sports, tourism and travel have been hit hard by the pandemic. Life during “lockdown” in many countries has been extraordinarily silent and challenging. India is also experiencing lockdown these days to avoid bulk damage and fatalities. Infection is spreading steadily from the upper-class community to the lower-class community where the mass destruction from the disastrous will be difficult to contain [36]. The experts are suspecting that the recession is around the corner. The economy of almost all countries in different continents has been shattered by the pandemic. Meanwhile, the world is praying for things to be normal as soon as possible. To break the infection cycle, “social distancing for all” is one of the mandatory rules to be followed strictly. Work from Home option is getting attention as never before. Research and Developments with COVID-19 are currently active at an enormous speed.

6. Conclusion

Coronaviruses are enveloped RNA viruses that cause respiratory illnesses of varying severity from the common cold to fatal pneumonia. It is more than just a common cold ranging from respiratory diseases to severe pneumonia. In the age of technology, due to the fast development of genome sequences of the novel virus, the research community was engaged rapidly in providing analysis, simultaneously developing antidotes and diagnostic tests. This is the first time any epidemic was so quickly and so accurately analysed and predicted using machine learning and artificial intelligence paradigms. Many biotech companies are coming with artificially intelligent solutions to speed up the fight against the coronavirus global outbreak. The unique circumstances of the epidemic have made a tremendous interest in online clinical administrations and information. Confinement to homes especially for kids is a serious matter of concern and will have a major impact on their mindset if the epidemic gets prolonged. Some superstitious aspects of such epidemics also exist. A Hollywood based Science fiction movie Contagion is said to have shown an example of the pandemic just similar to COVID-19 in 2011. Till now, a huge amount of literature has been originated by researchers around the globe regarding SARS-Cov2, Coronavirus outbreak, and COVID-19. As of now, many aspects of the coronavirus researches have been unfolded and many are still untouched; such as predicting the impact and spread of the pandemic in upcoming days in the major countries of the world on different scales and different parameters. One piece of advice from authors to the world during a pandemic of such mass scale is to stay away from rumours and do not spread fear. Effective containment can flatten the exponential growth curve of infections due to the pandemic.

In this work, authors have focused on the novel coronavirus, its symptoms, infection spread and precautions. The study also throws some light on the role of technology

in dealing with the outbreak. Also, an understanding of the epidemic impact in diverse fields of life has discussed. Recently, Mittal et al. [33] detected pneumonia using convolutions and dynamic capsule routing through chest X-rays. In the future, many more AI, ML, and DL applications and tools will be used for fighting such emergent situations all across the world. Mental Health and Stress Level Patterns during such pandemics can be detected and analysed using artificial intelligence and deep learning.

Conflict of Interest

The authors declare no conflict of interest.

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